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Abstract

CO_2 CIRCUITS IN NUCLEAR POWER STATIONS

by

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This report deals with the typical equipment employed in the primary CO_2 circuits of French nuclear power stations using carbon dioxide gas as coolant. This equipment consists essentially of :

- Heat exchangers
- Fans
- Units peculiar to the circuit (obturators, compensating devices).

The heat exchangers associated to the reactor of a nuclear power station of the natural uranium-graphite CO_2 sequence consist in all plants now built or now being completed (Chinon, EDF 1, EDF 2 and EDF 3) of a certain number of identical units working in parallel.

A brief description of the different types is given, together with a list of advantages of this type of solution.

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In new power stations of the integrated type (EDF 4) the heat exchanger is housed within the pressure-vessel and thus forms a discrete monobloc unit. Because of this, it has different structural and operational characteristics, which are also mentioned.

As regards the blowers, first and foremost, the vital part played by these in a nuclear power station is explained. Indeed, these machines must operate both reliably and efficiently.

The way in which the best-suited type of machine is chosen, how it is to be driven, the possibilities of adapting it to suit the characteristics of the circuit and the principal problems arising in installing the machines are then examined.

The various solutions adopted by Electricité de France for the different power stations are reviewed, and a list is given of all the difficulties encountered during development and starting up.

Lastly, special mention is given of the various characteristics of the blowers employed in integrated solutions.

Bellows and obturators are also mentioned. These primary circuit devices are difficult to design and implement.